TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressure during July, 1925*

TEMPERATURE (°C.).

Altitude m. s. l. meters	Broken Arrow, Okla. (233m.)		Drexel, Nebr. (396m.)		Due West, S. C. (217m.)		Ellendale, N. Dak. (444m.)		Groesbeck, Tex. (141m.)		Royal Center, Ind. (225m.)	
	Mean	Departure from 7-yr. mean	Mean	Departure from 10-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 7-yr. mean	Mean	Departure from 8-yr. mean
Surface	26.8	−0.1	24.6	0.0	29.5	+2.2	20.3	−0.9	28.0	+1.1	24.1	−1.1
250	26.7	−0.1	------	------	29.0	+2.1	------	------	26.9	+1.0	23.7	−1.2
500	25.2	0.0	23.8	−0.2	25.8	+1.5	19.8	−1.1	24.6	+0.6	21.1	−1.3
750	24.4	+0.6	22.4	−0.3	23.8	+1.3	18.4	−1.2	23.5	+0.7	19.3	−1.2
1,000	23.2	+0.8	21.1	−0.2	22.1	+1.4	17.2	−1.2	22.9	+1.1	17.4	−1.3
1,250	21.7	+0.9	19.8	−0.1	20.2	+1.3	16.1	−1.2	22.0	+1.4	15.4	−1.6
1,500	20.1	+0.9	18.3	−0.1	18.3	+1.1	14.5	−1.6	20.7	+1.5	14.0	−1.4
2,000	16.8	+0.8	16.1	+0.7	14.5	+0.6	11.5	−1.9	17.7	+1.2	11.0	−1.6
2,500	13.5	+0.7	12.8	+0.6	10.6	−0.1	8.3	−2.1	14.8	+1.1	8.6	−1.3
3,000	10.2	+0.7	9.4	+0.5	6.8	−0.7	5.5	−2.0	11.6	+0.7	5.5	−1.4
3,500	7.2	+0.6	5.9	+0.4	3.7	−0.6	3.0	−1.6	8.5	+0.6	2.9	−1.1
4,000	4.0	+0.6	2.3	0.0	0.9	−0.6	0.2	−1.7	4.9	+0.2	−0.6	−1.8
4,500	1.4	+0.6	−1.5	−0.5	------	------	−2.0	−1.5	------	------	------	------
5,000	−1.3	+0.6	−4.3	−0.7	------	------	−4.6	−1.4	------	------	------	------

RELATIVE HUMIDITY (%)

Surface	66	−3	60	−5	54	−11	65	−4	66	−7	64	+2
250	66	−3	------	------	54	−11	------	------	69	−5	64	+2
500	64	−2	59	−4	58	−9	64	−4	73	−2	66	+2
750	61	−4	58	−2	61	−8	61	−3	70	0	70	+4
1,000	59	−6	57	−2	62	−9	57	−4	60	−5	72	+5
1,250	60	−6	56	−2	63	−9	55	−4	53	−9	74	+7
1,500	62	−4	56	−2	64	−7	55	−2	52	−9	72	+5

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressure during July, 1925*—Continued

RELATIVE HUMIDITY (%)—Continued

Altitude m. s. l. meters	Broken Arrow, Okla. (233m.)		Drexel, Nebr. (396m.)		Due West, S. C. (217m.)		Ellendale, N. Dak. (444m.)		Groesbeck, Tex. (141m.)		Royal Center, Ind. (225m.)	
	Mean	Departure from 7-yr. mean	Mean	Departure from 10-yr. mean	Mean	Departure from 5-yr. mean	Mean	Departure from 8-yr. mean	Mean	Departure from 7-yr. mean	Mean	Departure from 8-yr. mean
2,000	65	0	48	−8	69	−2	52	−2	54	−5	71	+9
2,500	67	+3	51	−4	71	0	51	−1	55	−2	55	0
3,000	71	+8	50	−4	67	−2	48	−1	59	+3	53	+1
3,500	73	+11	53	−1	58	−7	45	−3	65	+8	54	+5
4,000	77	+15	59	+7	60	−1	43	−5	75	+16	56	+11
4,500	67	+11	86	+30	------	------	34	−15	------	------	------	------
5,000	66	+8	86	+34	------	------	36	−10	------	------	------	------

VAPOR PRESSURE (*mb.*).

Surface	22.92	−1.07	18.69	−1.16	21.05	−1.69	15.62	−1.63	24.47	−0.94	19.68	−0.15
250	22.85	−0.94	------	------	20.76	−1.62	------	------	23.96	−0.54	19.29	−0.25
500	20.44	−0.42	17.57	−1.24	18.61	−1.33	14.91	−1.75	22.23	+0.07	17.07	−0.19
750	18.63	−0.10	15.58	−1.03	17.37	−1.05	13.00	−1.39	19.75	+0.40	16.12	+0.41
1,000	16.84	−0.22	14.17	−0.91	16.04	−0.99	11.08	−1.72	16.19	−0.57	14.72	+0.31
1,250	15.53	−0.06	12.90	−0.81	14.67	−1.02	9.83	−1.62	13.52	−1.29	13.44	+0.43
1,500	14.43	+0.31	11.67	−0.68	13.53	−0.51	8.91	−1.30	12.29	−1.13	11.76	+0.14
2,000	12.41	+1.04	8.77	−1.08	11.75	+0.25	6.82	−1.38	10.59	−0.59	9.35	+0.51
2,500	10.56	+1.44	7.61	−0.24	9.55	+0.23	5.47	−1.21	9.11	−0.10	6.28	−0.18
3,000	9.06	+1.78	6.48	+0.29	7.22	−0.17	4.48	−0.86	7.96	+0.21	5.43	+0.36
3,500	7.60	+1.69	5.76	+0.85	5.27	−0.24	3.70	−0.74	7.62	+1.05	5.16	+1.14
4,000	6.36	+1.83	5.38	+1.48	4.65	+0.42	2.90	−0.75	7.64	+2.00	4.38	+1.27
4,500	4.96	+1.66	5.95	+2.61	------	------	1.92	−1.32	------	------	------	------
5,000	4.69	+1.63	5.05	+2.50	------	------	1.72	−1.19	------	------	------	------

TABLE 2.—*Free-air resultant winds (m. p. s.) during July, 1925*

Altitude, m. s. l. (meters)	Broken Arrow, Okla. (233 meters)				Drexel, Nebr. (396 meters)				Due West, S. C. (217 meters)				Ellendale, N. Dak. (444 meters)				Groesbeck, Tex. (141 meters)				Royal Center, Ind. (225 meters)			
	Mean		7-year mean		Mean		10-year mean		Mean		5-year mean		Mean		8-year mean		Mean		7-year mean		Mean		8-year mean	
	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.	Dir.	Vel.
Surface	S. 16°E.	2.3	S. 2°E.	3.0	S. 50°W.	0.7	S. 3°W.	2.0	S. 71°W.	2.5	S. 67°W.	1.3	N. 14°W.	2.5	N. 19°W.	0.1	S. 33°W.	5.5	S. 21°W.	3.6	S. 84°W.	1.9	S. 80°W.	1.7
250	S. 14°E.	2.4	S. 2°E.	3.2	------	------	------	------	S. 70°W.	2.7	S. 69°W.	1.4	------	------	------	------	S. 31°W.	6.6	S. 22°W.	4.4	S. 81°W.	1.9	S. 80°W.	1.8
500	S. 10°W.	4.0	S. 11°W.	4.6	S. 31°W.	0.9	S. 4°W.	2.9	S. 76°W.	3.1	S. 78°W.	2.0	N. 19°W.	2.8	S. 7°W.	.2	S. 37°W.	8.4	S. 30°W.	6.2	N. 87°W.	4.1	S. 76°W.	3.3
750	S. 24°W.	4.7	S. 20°W.	5.0	S. 66°W.	1.8	S. 18°W.	3.9	S. 80°W.	3.3	S. 85°W.	2.4	N. 39°W.	2.6	S. 22°W.	1.1	S. 36°W.	8.6	S. 30°W.	6.3	N. 83°W.	5.2	S. 76°W.	4.2
1,000	S. 31°W.	4.4	S. 27°W.	4.8	S. 83°W.	2.4	S. 26°W.	4.3	W.	3.6	S. 88°W.	2.7	N. 44°W.	3.1	S. 50°W.	1.7	S. 32°W.	8.1	S. 30°W.	6.0	N. 79°W.	6.6	S. 80°W.	4.8
1,250	S. 42°W.	4.0	S. 32°W.	4.6	N. 88°W.	3.0	S. 38°W.	4.4	N. 89°W.	4.7	S. 86°W.	3.0	N. 69°W.	3.0	S. 60°W.	2.2	S. 30°W.	6.7	S. 31°W.	5.4	N. 86°W.	6.8	S. 81°W.	5.5
1,500	S. 55°W.	3.8	S. 37°W.	4.5	N. 80°W.	4.5	S. 47°W.	4.4	N. 85°W.	6.1	S. 87°W.	4.3	N. 54°W.	4.5	S. 72°W.	2.9	S. 26°W.	5.6	S. 31°W.	4.9	N. 84°W.	8.5	S. 86°W.	6.2
2,000	S. 79°W.	2.6	S. 41°W.	3.6	N. 81°W.	5.0	S. 58°W.	4.9	N. 78°W.	7.6	S. 88°W.	5.6	N. 49°W.	5.4	S. 87°W.	4.2	S. 23°W.	4.2	S. 30°W.	4.0	N. 80°W.	9.1	S. 88°W.	7.3
2,500	W.	3.2	S. 52°W.	3.8	N. 78°W.	6.0	S. 73°W.	5.5	N. 73°W.	9.5	N. 88°W.	6.4	N. 56°W.	7.2	N. 84°W.	6.0	S. 7°W.	4.0	S. 27°W.	3.6	N. 73°W.	11.8	N. 87°W.	9.6
3,000	W.	3.0	S. 62°W.	4.3	N. 70°W.	6.3	S. 74°W.	6.2	S. 87°W.	11.3	S. 86°W.	7.9	N. 52°W.	8.7	N. 82°W.	7.6	S. 9°W.	5.3	S. 22°W.	3.7	N. 78°W.	8.5	S. 89°W.	11.2
3,500	N. 75°W.	5.4	S. 69°W.	2.9	N. 67°W.	8.2	S. 77°W.	7.1	N. 67°W.	10.1	N. 85°W.	7.5	N. 57°W.	11.8	N. 74°W.	9.9	S. 8°W.	7.4	S. 15°W.	2.4	N. 76°W.	9.2	S. 87°W.	10.7
4,000	N. 59°W.	6.9	S. 74°W.	6.7	N. 74°W.	9.7	S. 80°W.	7.6	N. 89°W.	11.4	N. 81°W.	8.4	N. 56°W.	12.9	N. 68°W.	11.2	S. 45°W.	8.0	N. 83°W.	1.1	N. 61°W.	9.7	N. 70°W.	9.5
4,500	N. 55°W.	12.8	S. 66°W.	8.6	S. 78°W.	7.9	S. 66°W.	7.7	------	----	------	----	N. 61°W.	13.2	N. 63°W.	13.2	S. 45°W.	7.0	N. 18°E.	3.6	N. 45°W.	10.0	N. 46°W.	8.4
5,000	N. 45°W.	15.0	S. 30°W.	4.5	S. 22°W.	8.1	S. 55°W.	8.4	------	----	------	----	N. 83°W.	14.2	N. 73°W.	15.3	------	----	------	----	------	----	------	----

THE WEATHER ELEMENTS

By P. C. DAY In Charge of Division

PRESSURE AND WINDS

The distinctive feature of the atmospheric pressure during July was the persistence of anticyclonic conditions, which produced, however, in different portions of the month almost opposite effects upon the weather over large areas of the country.

During the first half of the month anticyclones had their origin mainly over the western interior and moved slowly eastward over the Central and Southern States. This distribution favored warm weather over most of the country from the Rocky Mountains eastward, with frequent thundershowers and local high winds, particularly over the Central States, from the 12th to the 16th.

Beginning with the middle of the month and continuing until the close, anticyclones entered the United States at frequent intervals from the Canadian Northwest, and, moving eastward mainly over the Northern States, favored changes to cooler weather over all northern and central districts. During this period showers still prevailed in many northern and central districts, and local high winds were rather frequent, particularly about the 24th to the 26th from the middle plains eastward to Pennsylvania and Maryland.

The cyclones were of the ordinary summer type, though fewer in number and mainly less well defined than usual. No single cyclone materially influenced precipitation over any extensive path, save in a few cases along the northern border, and on the 26th to 28th when a low pressure area moved along the coast from North Carolina, passing east of New England attended by moderate to locally heavy rains.

The average barometric pressure was relatively high over the Gulf and South Atlantic Coast States, and in the upper Missouri Valley and the far Northwest, and relatively low over the Canadian Maritime Provinces, and the far Southwest.

Average pressures were below normal over the greater part of the country from the Mississippi Valley eastward, the largest deficiencies occurring from the southern Appalachian Mountains northward to Ontario.

From the Great Plains westward to the Pacific the average pressure was mainly above normal, the largest excesses appearing over the central Rocky Mountains and northern Great Plains.

Pressure was higher than during June over all central and western districts of both the United States and Canada, and lower over the eastern third of both countries, a condition not unusual, except that the positive changes from June to July in the Great Plains and Rocky Mountain regions and the negative changes in eastern districts were both materially larger than usual.

The prevailing winds were mainly southerly from the middle and southern Plains eastward to the Atlantic coast and thence northward to New England, also over much of the Ohio Valley and lower Lake regions.

From the Dakotas eastward to the upper Lakes the prevailing winds were mainly from northerly points. Elsewhere they were variable. The details of the more important storms of the month follow at the end of this section.

TEMPERATURE

The first two weeks of July, 1925, were hot over the greater part of the country, save during the first week in parts of the Southwest, from the upper Lakes to New England, and over the north Pacific coast. The second week was particularly warm in the central valleys, Great Plains and northern Plateau regions, where weekly means ranged from 5° to 10° above normal, and maximum temperatures were above 100° at many points in the Great Plains and Southwest.

During the third week temperatures continued high from the Rocky Mountains westward, and over the Southern Great Plains, where the weekly means ranged up to 10° above normal, and maximum temperatures were frequently above 100°. From the Missouri and middle Mississippi Valleys eastward this week brought much-needed relief from the severe heat of the preceding weeks and the weekly averages were mainly lower than normal.

The last decade experienced important and gratifying changes in temperature, the period as a whole averaging mainly cooler than normal over the middle and northern sections, and moderately warmer than normal in the more southerly sections. The month as a whole was moderately warmer than is usual in July over the entire southern half of the country, and from the central Plains and northern Rocky Mountains westward to the Pacific except in extreme northwest Washington.

In the southern Appalachian Mountain regions, the southern Plains States, and from Nevada and Utah northward to Idaho and eastern Washington the month was decidedly warm.

From the Dakotas and upper Mississippi Valley eastward to the Ohio Valley and Northeastern States, there was much delightfully cool weather, the monthly averages being below normal, and materially so from the lower Lakes to New England.

In a few sections, notably in the western parts of the Carolinas, in northern Georgia, and in portions of the northern Plateau regions and in southern California the monthly means of temperature were among the highest on record.

In a number of the Northwestern States July makes the seventh consecutive month with average temperatures above normal.

Maximum temperatures were 100 or above at some time during the month in all the States, save New England, New Jersey, and Wisconsin. They were above 120° at points in Arizona and California, and 110° or above in practically all other States from and including the Great Plains westward. At numerous points west of the Rocky Mountains and over the southern Great Plains the maximum temperatures were the highest of record for July, and locally in California, Arizona and some other western sections they were the highest ever observed. In portions of California the unusual heat near the middle of the month caused several deaths, many prostrations, some damage to fruits and vegetables, and a general suspension of activities.

The warmest days were mainly during the first week from the Mississippi River eastward, except in the Gulf States, and about the middle of the month in the lower Mississippi Valley and from the Great Plains westward, except in Oregon and Washington where the warmest weather occurred on the 31st.

Minimum temperatures were at or near the freezing point on several occasions during the last decade in the more northern States and at exposed points in both the eastern and western mountain districts, and light frosts were observed as far south as northwestern Nebraska.

At Duluth, Minn., the minimum temperature on the 29th was the lowest of record for July, and the nights were unseasonably cool during much of the latter part of the month in the Northeastern States.

PRECIPITATION

Precipitation for the country as a whole was more or less scanty, and while considerable areas had more than the normal fall, these in the main comprised States with large surface areas but having normally only small amounts of precipitation in July, and hence the total precipitation deposited during the month was far less than normal. The deficiencies in the monthly totals were large over the south Atlantic and portions of the East Gulf States, notably in the Carolinas, northern Georgia, southern Florida and much of Tennessee. Texas had a large deficiency over the central and eastern districts, and precipitation was generally deficient to a considerable extent in the eastern Great Plains, the middle and upper Mississippi Valley, the upper Missouri Valley and the far Northwest.

There was a substantial excess of precipitation over New Jersey, much of Pennsylvania and New York, and generally over southern and northwestern New England. Otherwise than as noted it was mainly not far from normal save in a few small areas.

Generally speaking, precipitation was well distributed through the month over the areas where considerable amounts usually fall, thus in a way mitigating the harmful effect in localities where the falls were less than normal. The moderately cool weather during the latter half of the month over most central and eastern districts also lessened evaporation, compensating in some degree the deficiency in precipitation.

Some unusually heavy rains occurred, notably in the vicinity of Dubuque, Iowa, on the 3d and 4th, causing

damage amounting to $50,000 or more, also at Detroit, Mich., on the night of July 31–August 1, where much damage resulted from flooding.

The total fall was unusually heavy in portions of Pennsylvania; Nevada as a whole, had the second wettest July of record. On the other hand the monthly amounts in the Carolinas and Georgia were the least of record, or among the least, for July, in a period of nearly 50 years.

At the end of the month severe drought existed in the southern Appalachian region, and the lack of water for power and other purposes was becoming acute. In parts of western and northern Louisiana, and over much of Texas, drought has continued for many months, and the high temperature and excessive sunshine greatly intensified the injurious effects of deficient soil moisture.

SNOWFALL

As far as reports received indicate, no snow fell except at a few points in the high mountains of Colorado.

RELATIVE HUMIDITY

Over the greater part of the country relative humidity was less than normal, the deficiencies being large south of the Ohio River, in the area between the Mississippi River and the Rocky Mountains, and over most of the far Northwest. In portions of Washington it was abnormally low on the 18th and 19th when values of only 4 or 5 per cent were reported at several points.

There were moderate excesses generally from the upper Mississippi Valley eastward, and over the middle and southern Rocky Mountain and Plateau regions, and locally over the Pacific Coast States.

SEVERE LOCAL WIND AND HAIL STORMS, JULY, 1925

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path (yards) [1]	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Pocatello, Idaho	1	P. m.				Thunderstorm and hail.	Streets flooded; 2 horses killed	Official, U. S. Weather Bureau.
Salt Lake City, Utah (vicinity of).	1			1		Thunderstorm	Considerable property damage	Do.
Chattanooga, Tenn., and vicinity.	3	12.55 p. m.				Thunderstorm and rain.	Some trees damaged, others blown down; telephone service crippled.	Chattanooga Times.
Thomaston, Ga. (5 miles west of).	3	3.30 p. m.	880–1,760		$14,000	Moderate hail and wind.	Loss to peaches over path 2 miles long; other minor damage.	Official, U. S. Weather Bureau.
Benton County, Iowa	3	4.30 p. m.				Hail	Crop loss about 25 per cent	Do.
Dubuque, Iowa	3	5 p. m.			50,000	Wind and heavy rain.	Extensive damage to buildings; trees blown down; basements flooded; traffic obstructed.	Do.
Rockford, Ill	3	5.45 p. m.	1,760		5,000	Thundersquall	Roofs, windows, and trees damaged; 2 persons injured.	Do.
Brooklyn, Wis	3	6.30 p. m.	1,760		1,000	Wind	Damage principally to silos and poles	Do.
Between Belleville and Monticello, Wis.	3	P. m.				Violent wind	Farm buildings, wires, trees, and shrubbery damaged.	Capital Times (Madison, Wis.).
Hazelhurst, Ga	3					High wind	Schoolhouse, trees, and poles blown down	Official, U. S. Weather Bureau.
Scottsville, Kans	4	1–2 a. m.	440			Heavy hail	Crops injured	Do.
Between Pocatello and Mink Creek, Idaho.	4	Noon				Tornado	Cloud moved northward; did not reach ground; observed 20 minutes.	Do.
Jackson, Tenn. (near)	4					Wind	Barn blown down; trees uprooted	Do.
Greenville, S. C., and vicinity.	4	2.15 p. m.		1	2,000	Thunderstorm and hail.	Crops damaged in small area; about 200 telephones out of order.	Greenville News (S. C.).
Wichita, Kans. (near)	6	3 p. m.	440		2,000	Violent wind	Path 1 mile long	Official, U. S. Weather Bureau.
Eastern Cherry and northwestern Brown Counties, Nebr.	6	4.45–5 p.m.	300–500			Hail	Windows broken, roofs damaged, and crops more or less harmed over small area.	Do.
Washington County, Md	6	5 p. m.			2,000	Thundergust	One building demolished, several damaged; trees uprooted; fences blown down.	Do.
Cherokee, Jasper, Johnson, and Appanoose Counties, Iowa.	6	8 or 9 p. m.	4–6 mi.		150,000	Wind and hail	Crop loss estimated at 80 per cent. Heavy property damage.	Do.
Dysart, Iowa, and vicinity	6	P. m.				Hail	Considerable crop loss reported	Do.
McPherson County, Kans	6	P. m.		1		Violent wind	Damage principally to telephone lines and out buildings on farms.	Do.
Paducah, Tex. (near)	7	4 p. m.	50		12,000	Small tornado	Houses and farm property damaged. One person injured.	Do.
Windsor, Conn	7				25,000	Thunderstorm and hail.	Tobacco and corn crops injured, 500 acres hail cut. Minor property damage.	Do.
Woodbury County, Iowa	8	4 p. m.	880		10,000	Hail	Heavy crop damage; no other losses reported	Do.
Cherokee County, Iowa	8	7 p. m.	3 mi.		75,000	Wind and hail	Heavy crop loss; many buildings and windmills damaged; poles split.	Do.
Kent County, Del. (north part of).	8	7 p. m.				Heavy hail	Severe crop damage	Do.
Marathon County, Wis	8	7–7.45 p.m.	2½ mi		75,000	Heavy hail and wind.	Farm buildings and crops extensively damaged.	Do.
Lakota, Iowa	8	P. m.				Wind	Two homes wrecked; wires blown down and trees prostrated; much crop loss; 5 persons injured.	Do.
Minneapolis-St. Paul and vicinity, Minn.	8	P. m.		4		Tornadic wind, rain and hail.	Buildings damaged; basements flooded and crops injured by hail; 18 persons injured.	Pioneer (St. Paul, Minn.).
Whiting, Iowa	8	P. m.	3 mi.			Hail	Damage over path about 10 miles long estimated at 50 per cent.	Official, United States Weather Bureau.
Webster City to Fort Dodge, Iowa.	8	P. m.				Wind	Telephone poles leveled; small buildings blown over; crops flattened.	Do.
Blanca, Colo	9	2.30–3 p.m.			15,000	Hail	Head lettuce and other crops destroyed; many windows broken.	Do.
Western, N. Y.	10	A. m.			30,000	Electrical and rain.	Several farm buildings struck by lightning causing loss of stock, hay, wheat and some farm machinery.	Democrat Chronicle (Rochester, N. Y.).
Millen, Ga	11	3 p. m.				Thunderstorm, wind and hail.	Some trees uprooted; house struck by lightning and burned.	Official, United States Weather Bureau.
Sturgeon Bay, Wis	11	4 p. m.		1		Tornadic wind	Several buildings in business section damaged; 2 persons injured.	Press Gazette (Green Bay, Wis.).
Lane, Mont. (near)	12		1 mi.			Wind and hail	Crops damaged; several small buildings destroyed.	Record-Herald (Helena, Mont.).

[1] Mi. signifies miles, instead of yards.